AMENDMENTS TO THE SPECIFICATION:

Please amend the heading beginning at page 1, line 2, as follows:

TECHNICAL FIELD ~~FILD OF THE INVENTION~~

Please amend the heading beginning at page 1, line 5, as follows:

~~DESCRIPTION OF RELATED ART~~BACKGROUND

Please delete the heading beginning at page 1, line 9, which starts with:

Introduction

Please amend the paragraph beginning at page 1, line 10, as follows:

Middleboxes and midcom agents (MIDdlebox COMmunication agents) are specified in [1] and [2]. ~~Described in a very short and incomplete way.~~ Basically, middleboxes are intermediate devices in the Internet that require application intelligence for their operation.

Please delete the heading beginning at page 1, line 20, which starts with:

Middleboxes in prior…

Please amend the paragraph beginning at page 1, line 21, as follows:

Fig. 1 illustrates the use of middleboxes and according to ~~prior art~~ [1], [2]. A user A of a terminal equipment, TE, 1 communicates with a session controller 2 in order to set up communication, for example a video call on the cellular network, with user B that has a terminal equipment, 3. User A sends a communication request to the session controller which communicates with the parties

in order to set the conditions for the requested session, such as communication type, bandwidth and costs. This signalling is termed session signalling and takes place on a session layer. An example of a session layer signalling protocol is the Session Initiation Protocol (SIP). IP telephony is one example of a service supported by this protocol.

Please delete the heading beginning at page 3, line 3, which starts with:

Problem description

Please amend the paragraph beginning at page 3, line 10, as follows:

In accordance with the prior art this dilemma is solved in the following manner: a middlebox, sitting or located at the edge of a network and therefore called an edge middlebox, ~~that~~ receives an unknown flow, starts an admission control of the flow in order to determine if the unknown flow should be granted access to the network. Via IP control signalling the edge middlebox receives knowledge of the flow, the bandwidth the flow requires and the identity of the entity responsible for the unknown flow. Having this knowledge the edge middlebox signals a database in order to verify that the entity responsible for the flow, usually a subscriber, is a trusted entity and has a subscription that encompasses the used bandwidth. This part of the admission control is termed policy control. Another part of the admission control is to check that the network has resources available for the unknown flow. This check is typically done using hop-by-hop signalling from one node to another along the path from source to destination in order to verify that the links have sufficient bandwidth free to accommodate the bandwidth of the unknown flow.

Please amend the paragraph beginning at page 3, line 31, as follows:

In multi-access scenarios with multiple radio hops and requirements on session continuity in complex handover situations, the invention proposes the use of an IP layer signalling protocol to transfer control messages to the middleboxes in order to ascertain that a user data IP flow is processed correctly.

Please amend the paragraph beginning at page 3, line 31, as follows:

In multi-access scenarios with multiple radio hops and requirements on session continuity in complex handover situations, the ~~invention~~ technology described herein proposes the use of an IP layer signalling protocol to transfer control messages to the middleboxes in order to ascertain that a user data IP flow is processed correctly.

Please amend the heading beginning at page 4, line 24, as follows:

SUMMARY ~~OF INVENTION~~

Please amend the paragraph beginning at page 4, line 25, as follows:

The ~~present invention~~ technology described herein reduces the above problems to a great extent by providing a method, device and system for control of mobile packet flows ~~in accordance with claims 1, 11 and 12~~.

Please amend the paragraph beginning at page 5, line 13, as follows:

~~In accordance with the invention the~~ The signalling between a midcom agent and middleboxes is a master slave relation wherein the midcom agent acts as master and middleboxes as slaves in

order to provide the above advantages. The slaves register with the master. In reference [4] the signalling relation between a middlebox and a policy decision point (PDP) is a client server relation where a middlebox or router acts as a policy client and the PDP as a policy server in order to provide policy decisions. Reference [4] is not concerned with mobile flows that during ongoing sessions change routers, middleboxes or policy server. Further, reference [4] is not concerned with general control of individual packet flows from a control plane.

Please amend the paragraph beginning at page 5, line 27, as follows:

Fig. 2. is a block diagram illustrating a first example embodiment ~~of the invention~~ wherein the IP control plane is separated from the IP user plane,

Please amend the paragraph beginning at page 5, line 29, as follows:

Fig. 3. is a block diagram illustrating a second example embodiment ~~of the invention~~ wherein the IP control plane and the session control plane have been brought together,

Please amend the paragraph beginning at page 6, line 4, as follows:

Fig. 5. is a flow diagram of ~~a~~ an example method ~~in accordance with the invention~~,

Please amend the paragraph beginning at page 6, line 7, as follows:

Fig. 7. is a block diagram illustrating control layer signalling between domains ~~in accordance with the invention~~, and

Please amend the paragraph beginning at page 6 line 9, as follows:

Fig. 8. is a schematic block diagram illustrating an environment in which the ~~invention~~ technology described herein is used in order to control mobile packet flows.

Please amend the heading beginning at page 6, line 11, as follows:

DETAILED DESCRIPTION ~~OF EMBODIMENTS~~

Please amend the paragraph beginning at page 6, line 12, as follows:

A first non-limiting, example embodiment ~~of the invention~~ is shown in Fig. 2. The session layer and session signalling is the same as in Fig. 1. ~~According to the invention the~~ The IP layer 5 is divided into an IP control plane 4 and a user data plane 6 and the IP control signalling path is made independent of the user data path. The IP control signalling path on the IP control plane will follow the IP control signalling path illustrated by the double headed arrow 9. The IP layer 6 is correspondingly changed and will transport user data on the IP user data plane. A user data flow is shown with broad arrows 10 and passes middleboxes 13, 14 and a plurality of other nodes schematically shown at NO on its way between terminals 1 and 3. A midcom agent 15 is arranged at the IP control plane and controls the middleboxes. The midcom agent comprises control functions for the middleboxes it controls and provides control orders relating to how the middleboxes shall handle an individual flow. These functions relate to resource management, resource control, QoS control, firewalls, network address translators, etc. The control functions

are performed according to the session parameters for bandwidth and QoS that are negotiated using the session layer signalling protocol.

Please amend the paragraph beginning at page 6, line 27, as follows:

Since user flows may change their paths in consequence of a mobile user or network, the IP control layer has not full control of the user flows. ~~According to the invention this~~ This dilemma is solved by letting the flows themselves tell the midcom agent where they are. Each user flow shall therefore register its presence at the middleboxes it encounters on the IP user data plane on its way from source terminal to destination terminal. The middlebox at which a flow registers will in turn report the identity of the reported flow and its own identity to the midcom agent. The middlebox reports its identity so that the midcom agent can find the control functions related to the reporting midcom agent and send corresponding control orders to the middlebox. In this manner a reporting middlebox continuously updates the midcom agent about its functional capabilities.

Please amend the paragraph beginning at page 7, line 10, as follows:

The midcom working group has investigated protocols to be used as signalling protocols between middleboxes and a midcom agent and have found a couple of candidates, among these the standard Common Open Policy Service (COPS) protocol and the Simple Network Management Protocol (SNMP). None of these suggested midcom protocols, however, support flow registration in accordance with the ~~invention~~ technology described herein. ~~In accordance with the present invention~~ Instead, the existing midcom protocols are complemented with information elements required for supporting flow registration and flow control, and the

protocols so complemented will for reasons of simplicity be referred to as extended midcom protocols. ~~For obvious reasons and with~~ With regard to Fig. 2, the extended midcom protocol represents vertical signalling, while control signalling at the IP control plane 4 represents horizontal signalling.

Please amend the paragraph beginning at page 8, line 5, as follows:

~~The~~ An example means by which the IP layer is divided into an IP control plane and a user data plane is a packet marking mechanism which differentiates control packets from user packets as will be described in connection with Fig. 6.

Please amend the paragraph beginning at page 8, line 8, as follows:

In Fig. 3 a second non-limiting, example embodiment ~~of the invention~~ is shown, where the IP control plane 4 is separated from the user data path like in the first non-limiting, example embodiment, but this time the IP control plane and its control nodes, the midcom agent inclusive, is co-located with the session layer and its session control node 2. Also in this embodiment the user data flows register at the middleboxes and nodes they traverse and middleboxes in their turn register at the midcom agent. The user data flow is indicated with the bold double headed arrow 10 while the combined session layer and IP control signalling is indicated with the bold dot-dashed double headed arrow 18.

Please amend the paragraph beginning at page 8, line 16, as follows:

A main advantage with the non-limiting, example embodiment in Fig. 3 is that a single common session and IP control layer signalling protocol can be used, thus reducing the number of

signalling protocols and the overhead signalling taking place if a separate session protocol and a separate IP control layer signalling protocol are used. The common session and IP signalling protocol bears all information elements needed for the different functions and for the set up of network resources. Since the midcom agent interacts with many different networks that may use many different technologies the common signalling protocol is network independent and contains information elements that are so. The information elements contain sufficient information to translate from various local conditions. As an example consider reservation of bandwidth. Certain networks define bandwidth as peak rate bandwidth while other networks define it as the mean bandwidth.

Please amend the paragraph beginning at page 8, line 27, as follows:

Fig. 4 illustrates in more detail how the signalling between the user terminals 1 ~~an~~ and 3 takes place on different planes in accordance with the first non-limiting, example embodiment. In particular a flow registration procedure will be described with reference to the flow diagram of Fig.5.